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PHYSICAL EDUCATION AND THE USE OF TECHNOLOGIES DURING DISTANCE TEACHING: POSSIBILITY FOR INCLUSIVE OR EXCLUSIVE TEACHING?

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Abstract

The advent of new technologies has changed the educational and training scenarios especially during the emergency period caused by the COVID-19 pandemic. In fact, given the impossibility of traditional teaching, a new type of teaching was opted for: the distance teaching. During this period the teaching that has undergone the most changes is Physical Education. Physical Education should be one of the most important subjects in educational and teaching processes, especially in the digital age, as a sedentary lifestyle and the lack of healthy physical activity only brings disadvantages. School teaching, as well as the training of sports science' teachers by universities, must be revised and must include methodologies and technologies that allow future teachers to be ready in the case of periods such as the current one, or in general, to integrate methods and tools that can increase students' interest in this discipline. It could be argued that the impossibility of doing activities on the move has caused what we could define as a "dispersion from the teaching of *physical education*" in the school. This dispersion affects pupils with special educational needs even more as dispensatory measures and compensatory tools were sometimes not as applicable or effective as during traditional teaching.

Keywords

Physical Education, Motor and Sport Sciences, Technologies, Distance learning, School.

Introduction

The human being has always felt the need to relate to others and to do so has created and used various tools and methodologies.

From writing to printing, from the telegraph to the telephone to the fax, up to *smartphones*, not to mention other communication tools such as theater, photography, cinema, television and computers. There has been a real revolution not only of the modes of communication, but also all the other sectors, as in them (i.e. education, economy, tourism, etc...) there have been technological innovations that have revolutionized the way to communicate or train.
These innovations have forced the population, especially *not millennials* (1981-1995), *generation z* (1996-2010) or subsequent generations, to have to adapt and know a practically new world, made of pitfalls and a language sometimes even incomprehensible. However, the diffusion of digital devices radically changing people's lives has opened new horizons and opportunities for growth.
The history of the introduction of technology in the educational environment began in the mid-1980s with the introduction of the first computers.
From the first National Informatics Plan (PNI) of 1985, through the Educational Technologies Development Programme (PSTD) of 1997 to the current National Digital School Plan (PNSD), activated in 2008 and still ongoing, initiatives to promote the use of ICT (Information and Communication Technologies) at school they have been many and have crossed strategies and methods of various kinds.
The acronym ICT (Information and Communication Technologies) or ICT (Information and Communication Technology) indicates the set of information and communication technologies that allow the processing and exchange of information, text, visual or sound in digital format.
In 1997, the Educational Technology Development Program (PSTD) began, targeting schools of all levels.
Then begins the era in which the computer becomes an instrument suitable for communicating in a "multimedia" way, that is, capable of conveying hypertexts specially built in order to be used and applied to any subject.

From digital content design for teaching to the introduction of interactive multimedia whiteboards (LIM) in class, the process of integrating ICT into the Italian school has gone through stages that have gradually led to the introduction of digital technologies in classroom teaching.
Starting from 2004, in Italy also began to appear the first LIM, computer peripherals similar to a slate, but in reality able to gradually change the classroom environment bringing with it the logic of the network and digital.
The LIM, but in general all the technologies that can be used in the educational-didactic environment, have allowed to acquire key competences for several years. The acquisition of *digital skills* (digital skills) was founded and developed with the use of technology at school, that over time and the various reforms has acquired an importance also with regard to inclusive teaching, the one that therefore allows all students (each with their own skills, abilities and limitations) to gain knowledge and skills in order to become truly citizens of the world.
Technology tools can not only integrate theoretical or digital skills, but also assist in the acquisition or consolidation of motor skills and abilities. Recent contributions from international scientific literature highlight how it can be integrated for motor education in general, both in formal education contexts (school) and informal (i.e. associations, organizations, etc...). *Physical Education* (motor science in Italy) has among its objectives to educate to the movement and allow students to acquire not only knowledge, but also skills and an awareness of your body and your motor experiences.
In this sense, the *Outdoor Movement Education* represents a "key to reading" that should be considered more during the formulation of the school curriculum inherent in the discipline of motor science in Italy. In a congress held in December 2020 on the *Outdoor Movement*

Education, all the researchers who attended the conference highlighted the need to increase awareness of the importance of outdoor play in supporting motor development and holistic development of children. The external environment should become part of the daily pedagogical routine of children and special attention should be paid to active movement (Tortella et al., 2021).
The discipline of motor science can reap many benefits through the integration of technological tools (i.e. *augmented reality*, wearable sensors, etc...) both for the evaluation component (assessment of skills or abilities) and for the inclusive component (the technology allows to overcome limits or allow pupils with disabilities/BES not to perceive even those limits) that for the cognitive component (i.e. interest, motivation, etc...) (Coppola, et al., 2021).
The advent of new technologies has also affected educational and training scenarios especially during the emergency period caused by the COVID-19 pandemic. In fact, given the impossibility of traditional teaching, we opted for a new type of teaching represented by DAD (Distance Learning). During this emergency period, the teaching that, perhaps, has undergone the most changes that have upset it is that of the motor sciences. All motor or sports activities during this period have suffered a significant decline (Tornaghi et al., 2020).
A recent article highlights, also, a significant decrease in levels of physical activity even more significant in the female gender due most likely to the increased participation of boys in organized activities (Sekulic et al., 2020).

In a period like the current one that lives the educational emergency due to the COVID-19 it is indispensable that the school revises the modalities of approach to the various disciplinary fields between which that relative to the sports and motor sciences, whose fundamental value is the respect of the rules, that not only allows to acquire technical competences, but it strengthens and consolidates the know-how and the know-how to be.

1. ***The digital school***

Today there is a need for educational, methodical and organizational renewal of the school. Educational environment and learning processes are innovated thanks to the contribution of informatics in the teaching process, therefore it is inappropriate to ignore the use of such tools. The needs, as well as the curiosity of the students has changed with respect to the past and this affects their propensity and their interest in what they study.
The relationship that exists between young people and technology is necessarily something that must be taken into account when planning how to pass on skills and knowledge to students (Coppola et al., 2021). To do this, not only pupils (MIUR, 2012) but also teachers need a new "cultural literacy". Tools that can integrate the teaching-learning process (i.e. images, videos, interactive whiteboards, computers, etc...) can also be mediators that also allow pupils with special educational needs to acquire knowledge. Used to build open and flexible learning paths, allow students to proceed, in appropriate educational contexts, to the acquisition of concepts, while maintaining their interest by seeing them closer to the world they experience daily.
Many years ago we began to discuss in scientific literature what has been called "educational revolution" characterized by the introduction of multimedia technologies that allow students to become protagonists in their learning and training process and also increasing motivation (Richmond, 1985).

In order to facilitate the learning process as much as possible, teachers can make use of various computer-managed programmes through which pupils interact with the environment through direct observation activities up to material concreteness. In particular, primary school is the elective place for multimedia as it increases the interest and curiosity of students through multisensory channels (i.e. sounds, images, etc...). We must not cancel the traditional teaching, but integrate it with the tools available that were previously not present in the teaching environment. The teacher of the future, as a dated article argues, but reporting a current reality, "will then have to prepare the pupils to manage and organize the huge mass of information, offered by new technologies, and help the child to fully train" (Laeng, 1986).

2. ***The development of technologies***

“The spread of digital media and the emergence of new styles of interactive communication are the most striking phenomenon of the economy and society, but also of the cultural and publishing industry between the end of the old and the beginning of the new millennium" (Ferri, 2011).
The relationship between children and technology is getting stronger. We are faced with an anthropological mutation that must be understood and evaluated both from the pedagogical and evolutionary point of view. US writer Mark Prensky (2010), an innovator in education and learning, in an essay he speaks of "*digital wisdom"* (digital wisdom). He, referring to the influence that new technologies have on the increase of man’s innate cognitive abilities, with this concept argues that digital technology can make man not only smarter but also wiser.
According to Prensky, the wise use of technologies increases *the problem-solving* capacity and will cause the transition from *Homo Sapiens* to *Homo Sapiens Digitale* because the continuous use of technology will change the brain structure (Prensky, 2010).
Thus human wisdom must be able to find valid solutions that are both brilliant and effective. Children consider digital technologies as natural elements and relate to them through a flood of digital tools for learning and educational and social communication: video games, *notebooks, smartphones, tablets*. All these digital tools integrate their social relationships and change the way they see the world. It can be highlighted that the touch screen gives access to children under three years giving them the opportunity to live new experiences in game modes such as watching videos, reading images, drawings. The screen is for them an attractive-distracting element that allows them to go beyond the threshold of imagination. They are stimulated to multitasking learning as they are able to perceive information through different channels. In this regard, it is considered appropriate to mention the investigation of the neuroscientist Manfred Spitzer (2013), author of important texts and articles on the use of technologies, which provides us with statistics on the overall use of various digital media such as television, computers, text players, music, images etc. (Spitzer, 2013).
In his work we can observe how, on average, children use technology about 10 hours a day and how 98% have used a *touch screen* under the age of four. These data can have a double value, one positive and one negative.
A recent review clearly highlights the pros and cons of using digital tools from an early age (Vedechkina & Borgonovi, 2021). The task of educators (which also includes that of teachers as such) is to be able to understand what is the boundary between a "technology" that has negative effects and one that manages to make the discovery of new skills and knowledge more appealing.

3. From traditional teaching to distance learning

The school world has always looked positively at the introduction of media that contribute to foster educational innovation with new materials, new techniques, new tools to develop learning processes. Already in the 60s the school was powered by more or less technologically advanced means that expanded the code of communication between teacher and learner. There is a vast production of aids alongside textbooks. It is only the beginning of the digital revolution.
In teaching, the so-called global media (video recordings, LIM, computers, *smartphones* with augmented reality, etc...) are used, capable of involving multiple languages and expressive forms. The world of media and modern technologies activate, in fact, functional processes for the growth and learning of the child, so much so that today the new generations grow in parallel with the development of digital technologies. The media are not only external supports, but condition the very forms of thought going to involve the internal processes of the mind.
In the age of global media, the school cannot ignore such tools, but through the Triennial Plan of Educational Provision (PTOF) it must be able to develop paths in which these tools constitute normal areas of knowledge and resources capable of encouraging a reorganisation of the educational context. n this regard, Law n. 107/2015 provides for the improvement of the educational offer increasingly declined to the educational needs of students and consistent with the need to orient them to the future. Among the elements of innovation is the new National Digital School Plan (PNSD) a document that contains shared and concerted indications that aims to launch schools to a path of digital innovation through the dissemination and use of new technologies by providing environments for digital education to encourage laboratory activities as a meeting point between knowledge and know-how. The MIUR, with Ministerial Decree No. 851 of 27 October 2015, adopted the National Digital School Plan (PNSD) to implement paragraph 56 of the aforementioned Law 107/2015. The PNSD basically has the task of directing the Italian school to find innovative strategies and strengthen its educational system in the digital age, so that the school can be an open space for continuous learning, in relation to the context of life. Its objective is to carry out activities aimed at developing pupils' digital skills through the strengthening and use of teaching and laboratory tools necessary to improve training. A school in step with the times that knows how to grasp innovations in relation to new European skills.. The tools and methodologies deriving from the integration of technological tools in teaching allow teachers to facilitate the learning of their students and to carry out interdisciplinary projects and works.
The discipline of motor science can and should integrate technological tools into its programming since: 1) its use allows a more reliable quantitative evaluation; 2) allows the teacher to more individualize his work with the various students of the class; 3) to increase the interest of its pupils; 4) to adapt activities for students with disabilities or special educational needs.

For a school oriented towards the future, therefore, it is necessary to adopt increasingly innovative methods of teaching through the use of modernization strategies through the use of new technologies to support teaching.
The proposals to support educational innovation are many and fit into a vast panorama that, as well as reversing the pre-packaged character of the lesson and the traditional course of school

hours leads to intense individual evolutionary learning knowledge of the class group. The people who are at the heart of the innovation of teaching methods are the teachers who are required a great deal of flexibility and ability to constantly get back into the game in the face of new challenges. " First of all, it is necessary to introduce the virtual dimension already from the Kindergarten, in the form of simulation learning that is completely lacking for children, while at the same time worrying about the effects of the violence of screens at this age.
Then, at primary school, it is essential to inform children about the general culture and about the dangers and benefits of screens. Thirdly, it is essential to leverage new practices developed thanks to digital to rethink pedagogy without necessarily introducing digital technologies to the primary: the important thing is to familiarize the child, from this age, with the relational and cooperative attitudes that he will be invited to develop later in his use of screens, especially in networking.
Finally, teachers should be trained to use these new tools so as to develop with them everything that the book culture neglects and commit to enhancing and encouraging digital creations, especially in adolescence" (Tisseron, 2016).

All this, however, predates the emergency period that, in recent years, has invaded and disrupted the lives of all including the school. The traditional teaching has had to make room for distance teaching (DAD) that although ideally presented potential, has also manifested itself in all its criticalities.
The main platforms used for this mode are: 1) G-Suite for education (Google Hangouts Meet and Google Classroom); 2) Office 365 Education; 3) Zoom; 4) Fidenia; 5) ClasseViva Spaggiari; 6) Classmill; 7) Socloo; 8) WeSchool; 9) Schoology; 10) Edmodo; 11) Giuntiscuola.it; 12) Padlet; 13) Eliademy; 14) Docety; 15) Moodle;16) Redooc.
The factors that have influenced a certainly not positive outcome have been mainly: 1) the teaching class that has not been able to fully adapt to the different form of communication; 2) the tools available to pupils and teachers, which very often have been limited; 3) the lack of a network strong enough to contain the huge flow of data. These are just three elements that prevented DAD from being as effective as hoped. Obviously there have been realities in which these "limits" have not been present and where the results have been better. A recent article examines and allows a more extensive reflection on the limits due to DAD, making particular reference to the teaching of the motor sciences, which by its nature, has some peculiar characteristics different from the other teachings.
The elements identified in this work are: 1) the internet connection (i.e. loss of connection, interruption of the total or individual activities); 2) the space not sufficient to perform physical activity safely in their homes; 3) lack of real preparation in the optimal way to carry out distance teaching (both for teachers and for pupils); 4) the lack of a scientific literature on digital teaching; 5) the lesser importance given to the teaching of physical education by parents/family members; 6) the difficulty of teachers to monitor the activity carried out by the students (i.e. not optimal and two-dimensional framing); 7) the process of evaluation and measurement of learning and/ or skills; 8) less student involvement in practical activities that have become notional; 9) the greatest difficulty during activities adapted for students with disabilities or DSA; 10) the increased stress and frustration for teachers during activities (Jackowicz & Sahin, 2021).
With regard to students with disabilities, the legislation in force in Italy already at the beginning of the pandemic, allows a teaching presence at the request of families. This, however, causes another problem, which is that the teacher is simultaneously committed to following the student in presence and his companions in telematic mode (especially when not "covered" for those hours by the support teacher).

Another recent research shows that teachers have perceived DAD as a necessary element, but not substitutable to traditional teaching. Walkers and colleagues highlight all the difficulties and weaknesses of this mode, but at the same time they point out how teachers are committed to acquiring new digital skills in order to continue doing their job (Girelli et al., 2020). The COVID-19 pandemic presented an unprecedented challenge for teachers globally, distance learning, for many teachers and students, has not proven as effective as face-to-face learning (Kimmel et al., 2020).
The closure of schools has caused difficulties not only for students, but also for families. Distance learning is a real challenge in developing countries because many parents have not been to school, lack the infrastructure and means (computers, tablets, etc...). Poor families and those that Tadesse and Muluye define as "digital illiterates" and with inadequate levels of education suffer most from this situation and this causes an increase in social inequality (Tadesse & Muluye, 2020). A Tiruneh study shows that in Ethiopia, over 80% of the population lives in rural areas with limited or no access to electricity, so it is difficult/impossible for students in these areas to learn or access digital lessons or information (Tiruneh, 2020).

4. ***Motor science and technology during the period of COVID-19***

Sport and physical activity at school represent an educational process of cultural construction that, through movement, help to master the dialogue between thought and language in its different forms in a process that goes from the outside to the inside and vice-versa.
The educational-motor-sports learning environment is gradually acquiring the place it should have had from the beginning; a role that sees the education to the movement, as an education necessary for the cognitive, social and physical development of all pupils.
Sports activities constitute, in fact, an active and participatory way to live the human relationship, so through the education to the movement a place of comparison of languages is established, codes, trends, identities favoring the process of awareness through doing: the growth of man is a process of internalization of ways of acting, imagining and symbolizing that exist in his culture, ways that amplify his powers.
Sport, in a form of advanced movement, represents an educational environment that at the same time can be a modern tool of inclusion. It facilitates autonomy, as the student is guided to be the protagonist of their abilities, to use their potential even outside the school context, to become aware of their limits and their resources. The sport experience has an interdisciplinary value as educating through sport includes the enhancement of the value components of sports practice, its community and democratic principles. Education to civil coexistence through the teaching of Motor Science and teaching *fair play* means not only the simple respect of the rules, but incorporates the concepts of friendship, respect for others, sporting spirit.
Fair play is a way of thinking and behaving and includes the fight against cheating, *doping*, physical and verbal violence, inequality of opportunity, commercialisation and corruption, all phenomena often witnessed by the news.
Doing sport at school becomes an opportunity and conscious involvement of participation and assumption of responsibility in the activities that are practiced, contributes to promoting sensitivity towards physical, personal and social well-being.
But what happened to this teaching during the emergency period? It is necessary to reformulate what may be the characteristics and aims of education at school at the time of COVID-19 and DAD, especially with regard to the teaching of physical education (Jackowicz & Sahin, 2021).
Several studies have highlighted the large limitations caused by what Almonacid-Fierro and

colleagues define as "No physical education classes at the time of COVID-19" In fact, in addition to the almost non-existent motor practice during distance teaching, another fundamental element that characterizes this teaching has been missing: the development of social skills (Almonacid-Fierro et al., 2021).
"The practice of regular physical exercises can minimize the occurrence of problems that directly affect people's behavior should be encouraged especially during social isolation during the pandemic period" (Jiménez-Pavón et al., 2020).
Recent study results in the United States have shown that 78.8% of students practiced physical activity "significantly less" or "a little less" than their typical school day (Pavlovic et al., 2021). Many students, therefore, have not been able to practice their normal sport or individual or group physical activity outside their homes. Regular physical activity should be encouraged during social isolation during the pandemic. The sports science teacher is a professional who can provide guidance and monitoring, so that the practice of exercise takes place in a correct and safe way. Among the strategies used to practice physical exercise in social isolation, sports science teachers provided monitoring and information on how to practice physical exercises using the web as a communication channel. At school, physical science teachers can organize a wide range of outdoor activities for students and offer them the opportunity to learn new skills and competences, but this teaching reproduced through distance teaching represents a challenge especially with regard to practical lessons that have shown numerous problems that adversely affect the experiences and learning of students (Jackowicz & Sahin, 2021).

Conclusions

Distance teaching and therefore "online learning" cannot by definition already have the same characteristics and results as a teaching in presence.
Despite the progress made after the first year of the pandemic, this mode of teaching cannot yet be considered a valid and concrete alternative, but a necessary and temporary replacement. Looking at the other side of the coin, however, one has to consider the positive effects that have emerged, especially for teachers: 1) the commitment to learning new teaching methods, tools and strategies to adapt to teaching in the digital environment (for many unknown until the beginning of the pandemic); 2) to re-evaluate and to appreciate more the didactics in presence, with all of its characteristics and peculiarities (i.e. social contact, active participation, sharing of a place of formation, etc...); 3) the possibility for teachers to use the acquired skills to integrate technology into the school and make the lessons more interesting (Coppola et al., 2021). The teaching of motor science should be one of the most important teachings in educational and educational processes, especially in the digital age, as sedentary and lack of healthy physical activity brings only disadvantages.
Sports teachers are concerned with educating and providing knowledge and skills through physical, sports and recreational activities for the healthy development of students who will be the future healthy citizens of the country.
Social differences, especially in areas at risk or in third world countries, have emerged even more strongly and should make all teachers think about how to alleviate these differences in the realities in which they live and work.
An easy-to-use digital resume should be designed to limit damage when needed. Exploring the features and functions of new and emerging technologies is an important task for teachers to engage in, particularly during physical education planning. In addition, it should be reviewed and expanded the educational offer of universities that train future teachers of Motor Science

with a digital literacy so that the future teacher will have the skills appropriate to the different needs of pupils or arising from certain situations (Jackowicz & Sahin, 2021).
As far as students are concerned, they do not all have the same access to technological devices and therefore to this type of teaching (Tudesse & Muluye, 2020). A recent review of scientific literature shows that 40 articles published in international journals point out that "many institutions and governments were not prepared for this abrupt migration to work and learning on digital platforms".
This has involved not only problems of inequality (i.e. social and economic differences), but also a lack of skills to allow and convey this type of learning (Talib et al., 2021). The teaching methodology, widely used in traditional teaching, especially in the presence of BES students, is that of peer to peer, or peer education, which is characterized by being a typology in which students interact, which become protagonists: the most prepared and ready acquire the role of educators for the weakest companions, fragile, disadvantaged, in difficulty of different types, under the guidance of the teacher. Their task goes beyond fostering simple and pure school learning as it involves the world of human relations, in an emotional-affective-social context in which everyone grows and matures in their potential, acquiring awareness and a sense of responsibility. "Technologies can facilitate inclusion in the educational context as well as the active participation in the social and working life of those in difficult situations" (Benigno et al., 2019). In fact, we can rely on technical innovations both to "donate" or compensate those skills that the student lacked with difficulty with respect to a certain function, and to allow him to participate in a social life and a learning context. In this way, it will be possible to make normal activities previously precluded, develop skills and disciplinary skills that respond to training needs, and learn content and information while always respecting the appropriate access methods. This methodology becomes almost impractical if we refer to the teaching of motor sciences at a distance, in fact, the distance between the companions makes it impossible to *peer to peer* for practical activities and presents many pitfalls for theoretical learning in this discipline.
The use of technology in the educational environment, with particular reference to the teaching of the physical sciences, should allow greater inclusion not only of pupils with disabilities, but also of pupils from different social contexts, and with different economic possibilities. A distance teaching, with the characteristics discussed above and without the guarantee of providing everyone with the same possibilities (i.e. connection, device, adequate spaces) risks becoming exclusive and not allowing all students to acquire skills and knowledge to be aware citizens of tomorrow.
In conclusion, we could say that the impossibility of doing moving activities has caused what we might call a "dispersion from the teaching of motor sciences" in the school.
This dispersion is of even greater concern to pupils with disabilities or special educational needs because the dispensation measures and compensatory instruments were sometimes not as effective or applicable as during the classroom.

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